

REVISIONS																			
LTR	DESCRIPTION										DATE	APPROVED							
A	Page 2- Added space to PIN for case finish. Added silver as case finish option. Page 3 - Added case finish to marking example. Page 5- Table I, revised footnote 1. Page 6 - Added a source of supply.										4 Jan 88	David Withrow							
B	Added additional packaging requirements. Added another suggested source of supply.										4 June 90	David Moore							
C	Inactivated dash numbers 004 through 007. Page 2 - Deleted thermal shock/immersion and moisture resistance tests. Page 4 - Changed lockwasher dimension. Page 5 - Changed IL values on -002 and -003 at 100 MHz & 200 MHz. Added application note 6.2. Page 6 - Added user of record paragraph. Editorial changes.										30 Apr 93	David Moore							
D	Inactivated dash numbers 001 through 003. Added gold case finish option; prohibited pure tin case finish. Changed sample rqmts for dc resistance/voltage drop test. Page 5- Added explanation of pure tin prohibition and cataloging information. Editorial changes.										12 Aug 94	David Moore							
E	Table I - IL changes on several dash numbers at 200 MHz and 1 GHz. Added new column for minimum IL at resonant frequency and added new footnote 3.										12 July 96	A. Ernst							
F	Added new suggested source of supply. Changed dash number 003, 200 MHz , insertion loss.										28 April 97	David Moore							
G	Page 2 – Removed MIL-T-10727 reference. Page 3 – Added Workmanship paragraph. Page 7 - Removed suggested source of supply. Editorial changes throughout.										27 APR 01	K. A. Cottongim							

The original first page of this drawing has been replaced.

Dash numbers 004 through 007 are inactive for design as of 30 Apr 1993.  
Dash numbers 001 through 003 are inactive for design as of 12 Aug 1994.  
For new design, use MIL-F-28861/6; M28861/06-001 through 007.

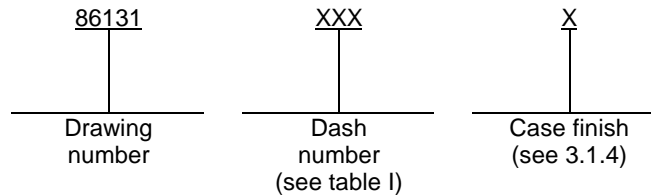
Prepared in accordance with MIL-STD-100 Selected item drawing

REV STATUS OF PAGES	REV	G	G	G	G	G	G	G										
	PAGES	1	2	3	4	5	6	7										
PMIC N/A	PREPARED BY Patrick Kyne							DEFENSE SUPPLY CENTER, COLUMBUS COLUMBUS, OH										
Original date of drawing:  22 January 1987	CHECKED BY Edward H. Back							TITLE FILTERS AND CAPACITORS, RADIO FREQUENCY/ ELECTROMAGNETIC INTERFERENCE SUPPRESSION, NONHERMETICALLY SEALED										
	APPROVED BY David E. Moore																	
	SIZE A	CODE IDENT. NO. 037Z3						DWG NO. 86131										
	REV G							PAGE 1 OF 7										

## 1. SCOPE

1.1 Scope. This drawing describes the complete requirements for radio frequency interference filters and capacitors.

1.2 Part or Identifying Number (PIN). The complete PIN will be as follows.



## 2. APPLICABLE DOCUMENTS

### 2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

#### SPECIFICATIONS

##### DEPARTMENT OF DEFENSE

MIL-PRF-28861 - Filters and Capacitors, Radio Frequency/Electromagnetic Interference, General Specification for.

#### STANDARDS

##### DEPARTMENT OF DEFENSE

MIL-STD-220 - Method of Insertion Loss Measurement.  
MIL-STD-1285 - Marking of Electrical and Electronic Parts.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Document Automation and Production Service, Building 4D (DPM-DODSSP), 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.3 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

## 3. REQUIREMENTS

3.1 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-PRF-28861 and herein.

3.1.1 Terminals. Terminals shall be solderable and in accordance with figure 1.

3.1.2 Case dimensions. The case dimensions shall be in accordance with figure 1.

3.1.3 Finish. The finish shall be T (tin plated or tin-lead plated), S (silver plated), or G (gold plated); in accordance with MIL-PRF-28861. (NOTE: Pure tin finish is prohibited after 13 February 1995 (see 6.3).)

3.2 Operating temperature range. The operating temperature range shall be -55°C to +125°C.

3.3 Temperature rise. The temperature rise shall be 25°C maximum.

3.4 Thermal shock and immersion (group B). Not applicable.

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3.5 Moisture resistance. Not applicable.

3.6 Seal. Not applicable.

3.7 Solderability of terminals. Solderability of terminals shall be in accordance with MIL-PRF-28861.

3.8 Electrical characteristics.

3.8.1 Rated voltage. The rated voltage shall be in accordance with table I.

3.8.2 Rated current. The rated current shall be 5 amperes maximum.

3.8.3 Capacitance. See table I.

3.8.4 Dissipation factor. The dissipation factor shall be 3 percent maximum.

3.8.5 Voltage and temperature limits of capacitance. The voltage and temperature limits of capacitance shall be +15 percent, -40 percent.

3.8.6 Insulation resistance:

At +25°C: 1,000 megohm-microfarad or 100,000 megohms minimum, whichever is less.

At +125°C: 100 megohm-microfarad or 10,000 megohms minimum, whichever is less.

3.8.7 Insertion loss:

At +25°C: In accordance with table I.

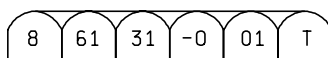
At -55°C and +125°C: A 3 dB degradation from the +25°C value shall be allowed.

3.8.8 Voltage drop: The voltage drop shall be 0.1 volt, maximum.

3.8.9 DC resistance. The dc resistance shall be 0.02 ohm, maximum.

3.9 Product assurance level: Product assurance level shall be class B only.

3.10 Marking: Filters shall be marked, as a minimum, with the PIN as shown in the following example. The unit package shall be marked in accordance with MIL-STD-1285, except the PIN shall be as specified in 1.2 with the manufacturer's name or code, voltage rating, and current rating.



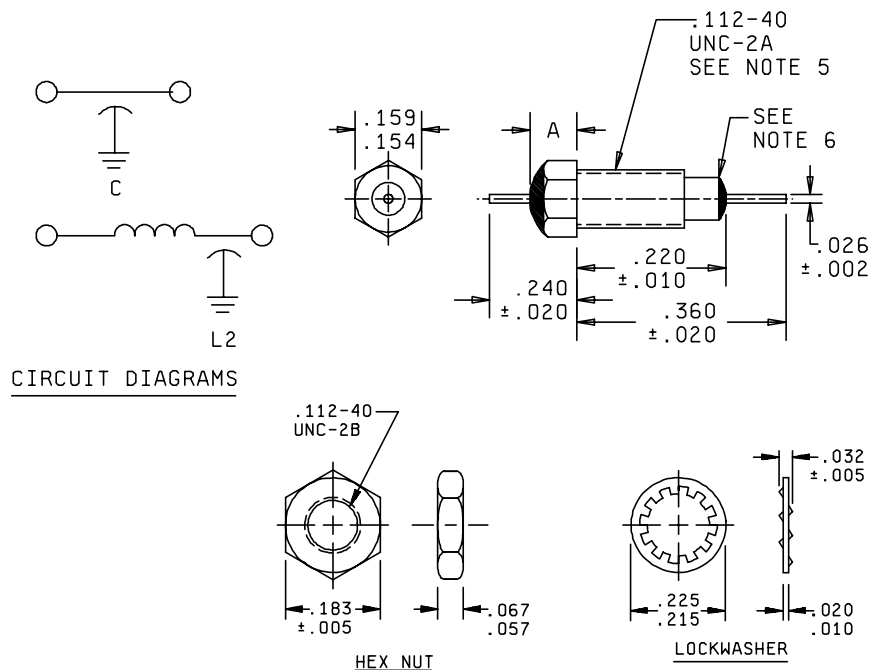
EXAMPLE OF MARKING FOR THE PIN  
ON THE HEX FLATS - EXPANDED VIEW.

3.11 Manufacturer eligibility. To be eligible for listing as a suggested source of supply, a manufacturer shall be listed on the MIL-PRF-28861 Qualified Products List (QPL) for at least one part or perform first article inspection in accordance with the MIL-PRF-28861 qualification inspection requirements for class B.

3.12 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.13 Workmanship. Filters shall be processed in such a manner as to be uniform in quality and shall be free from cold soldering, corrosion, pits, dents, cracks, rough or sharp edges, misalignments, and other defects that will affect life, serviceability, or appearance. Cracks in glass seals are not allowed, however, minor meniscus crazing is acceptable.

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Dash number	A dimension
-003	.145 ±.030
-001, -002 -004 thru -007	.120 ±.005

Inches	mm
.002	0.05
.005	0.13
.010	0.25
.020	0.51
.026	0.66
.030	0.76
.032	0.81
.057	1.45
.067	1.70
.112	2.84
.120	3.05
.145	3.68
.154	3.91
.159	4.04
.183	4.65
.215	5.46
.220	5.59
.225	5.72
.240	6.10
.360	9.14

**NOTES:**

1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Circuit diagram is for information only.
4. All filters shall be supplied with mounting hardware (hex nut and lockwasher).
5. One and one-half imperfect threads allowed .030 inch (0.76 mm) maximum.
6. One imperfect thread allowed .030 inch (0.76 mm) maximum.
7. Recommended mounting torque: 32 oz-inch ±4 oz-inch.
8. Potting shall not extend beyond .030 inch (0.76 mm) from the filter body.

FIGURE 1. Case and hardware dimensions and circuit diagrams.

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TABLE I. Electrical characteristics.

Dash number 86131	Circuit	Rated voltage V dc	Capacitance ( $\mu$ F) -0, +100 percent	Minimum insertion loss (dB) in accordance with MIL-STD-220 <u>1/</u> <u>2/</u>						Minimum insertion loss at resonant frequency <u>3/</u>
				1 MH z	10 MH z	100 MH z	200 MH z	1 GH z	10 GH z	
001	C	100	.027	10	30	39	43	65	70	40 Db 200 mHz - 1 GHz
002	L2	100	.027	10	30	50	45	70	70	-----
003	L2	100	.045	14	37	45	45	70	70	-----
004	C	200	1,000 pF	--	4	20	25	30	55	-----
005	C	200	5,000 pF	--	15	34	41	42	55	30 dB 200 MHz - 1 GHz
006	C	200	.01	4	21	35	42	50	70	35 dB 200 MHz - 1 GHz
007	L2	200	.01	4	21	35	44	50	70	35 dB 200 MHz - 1 GHz

1/ For C circuits, insertion loss measurements shall be made under no load. For L2 circuits, insertion loss measurements shall be made under full load over the frequency range of 1 MHz to 10 MHz; above this frequency range, insertion loss measurements shall be made under no load.

2/ Except as specified in 3/, the insertion loss requirements between any two adjacent specified frequencies shall be that of the lower of the two frequencies in order to accommodate resonant dips.

3/ The frequency range in which the resonant dip will occur and the minimum insertion loss at the resonant frequency.

#### 4. VERIFICATION

4.1 Qualification inspection. Qualification inspection is not required.

4.2 Conformance inspection.

4.2.1 Inspection of product for delivery. Inspection of product for delivery shall consist of group A and group B inspections of MIL-PRF-28861 for class B. (The dc resistance/dc voltage drop test shall be performed on a sample basis as specified in MIL-PRF-28861 group A inspection table.)

4.2.2 Certification. The acquiring activity, at its discretion, may accept a certificate of compliance with group B requirements in lieu of performing group B tests (see 6.3c).

4.2.3 Inspection of packaging. Inspection of packaging shall be in accordance with MIL-PRF-28861.

#### 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System command. Packaging data retrieval is available from the managing Military Departments or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

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## 6. NOTES:

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Filters conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. This drawing is intended exclusively to prevent the proliferation of unnecessary duplicate specifications, drawings, and stock catalog listings. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-28861, this drawing becomes obsolete and will not be used for new design. The QPL-28861 product shall be the preferred item for all applications.

6.2 Application note. These nonhermetically sealed filters may be susceptible to moisture intrusion when subjected to repeated thermal cycling. If these items are to be utilized in applications enduring harsh environments, the user should consider placing them within hermetic enclosures.

6.3 Tin plated finish. Pure tin plating is prohibited since it may result in tin whisker growth. Tin whisker growth could adversely affect the operation of electronic equipment systems. For additional information on this matter, refer to ASTM B545 (Standard for Electrodeposited Coating of Tin).

6.4 Cataloging information. Dash numbers 86131-001, -004, -005, and -006 shall be cataloged under FSC 5910 as feed-through ceramic capacitors. Dash numbers 86131-002, -003, and -007 shall be cataloged under FSC 5915 as radio frequency interference filters.

6.5 Ordering data. The contract or purchase order should specify the following:

- a. Complete PIN (see 1.2).
- b. Requirements for delivery of one copy of the quality conformance inspection data with each shipment of parts by the manufacturer.
- c. Whether the manufacturer performs the group B tests or provides certification of compliance with group B requirements.
- d. Requirements for notification of change of product to acquiring activity, if applicable.
- e. Requirements for packaging and packing.

6.6 Replaceability. Filters covered by this drawing will replace the same commercial device covered by contractor prepared specification or drawing.

6.7 User of record. Coordination of this document for future revisions, shall be coordinated only with the suggested sources of supply and the user's of record of this document. Requests to be added as a recorded user of this drawing should be in writing to: DSCC-VA, Post Office Box 3990, Columbus, OH 43216-5000 or by telephone to (614) 692-0562 or DSN 850-0562.

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6.8 Approved sources of supply. Suggested sources of supply are listed herein. Additional sources will be added as they become available. For assistance in the use of this drawing, contact DSCC-VAT, Post Office Box 3990, Columbus, OH 43216-5000 or by telephone (614) 692-0562 or DSN 850-0562.

DSCC drawing 86131-	Vendor CAGE number	Similar vendor type <u>1/</u>	Vendor CAGE number	Similar vendor type <u>1/</u>	Vendor CAGE number	Similar vendor type <u>1/</u>
001	OLSP2	SCI-9110-273L	66230	2125-2225-101B	59942	SA1A1273E
002	OLSP2	SCI-3112-007F	66230	2225-2225-101B	59942	SA2A1273W
003	OLSP2	SCI-3112-107G	66230	2225-2225-102B	59942	SA2A1453C
004	OLSP2	SCI-9120-102H	66230	2135-2225-101B	59942	SA1B1102C
005	OLSP2	SCI-9120-502J	66230	2135-2225-102B	59942	SA1B1502E
006	OLSP2	SCI-9120-103D	66230	2135-2225-103B	59942	SA1B1103B
007	OLSP2	SCI-3122-007D	66230	2235-2225-101B	59942	SA2B1103A

1/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirement of this drawing.

<u>Vendor CAGE</u>	<u>Vendor name and address</u>
OLSP2	Spectrum Control, Inc. 8061 Avonia Rd. Fairview, PA 16415
66230	Pacific Aerospace & Electronics, Inc Filter Division 434 Olds Station Road Wenatchee, WA 98801
59942	AVX Filters Corporation 11144 Penrose Street Unit 5 Sun Valley, CA 91352

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